

**REMARKS**

In accordance with the foregoing, the abstract, the specification, and claims 11 and 18 have been amended. Claims 1-16 and 18-21 are pending, with claims 1, 11, and 21 being independent. Claims 1-16 and 18-21 are under consideration as being generic. No new matter is presented in this Amendment After Final Rejection.

**Amendments to Abstract, Specification, and Claims and Entry of Amendment After Final Rejection**

The abstract and the specification have been amended to change "hole transfer" and "electron transfer" to "hole transport" and "electron transport" to achieve consistency in the abstract, the specification, and the claims as suggested by the Examiner on page 2 of the Final Office Action of March 23, 2007, and to correct spelling errors in paragraphs [0045] and [0052]. Independent 11 has been amended to incorporate the "electron transport layer" previously recited in claim 18 depending from claim 11, and claim 18 has been amended to be consistent with the change to claim 11, pursuant to a telephone interview between the undersigned attorney and the Examiner on June 19, 2007. Accordingly, it is submitted that entry of this Amendment After Final Rejection is proper under 37 CFR 1.116(b) and MPEP 714.12 and 714.13.

**Applicant's Statement of Substance of Interviews**

Telephone interviews were conducted on June 14 and 19, 2007, between the undersigned attorney, Randall S. Svhla, and Primary Examiner Dawn L. Garrett. The applicant's statement of the substance of the interviews required by MPEP 713.04 is as follows. The applicant has not yet received an Interview Summary for the interviews. Should the Examiner provide such an Interview Summary in the future, it is respectfully requested that the Examiner indicate in the Interview Summary that no further applicant's statement of the substance of the interviews is required because it has already been provided in this Amendment After Final Rejection.

During the telephone interview of June 14, the attorney went over in some detail the arguments presented below traversing the rejection of claims 11-16, 19, and 20 under 35 USC 103(a) as being unpatentable over Fujita and Kobori. There are two main points to these

arguments. One point is that the Examiner's interpretation of the electron transporting layer 71 comprising the donor 27 in FIGS. 5-12 and 14 of Fujita as being a hole-blocking layer that comprises an electron donor material as recited in independent claim 11 is unreasonable pursuant to MPEP 2111 because it is inconsistent with the interpretation that those skilled in the art would reach. The other point is that the doctrine of claim differentiation prevents the Examiner from interpreting Fujita's electron transporting layer 71 as being a hole-blocking layer as recited in claim 11 because claim 18 depending from claim 11 recites an electron transport layer, such that the Examiner is improperly reading this limitation of claim 18 into claim 11.

The attorney explained to the Examiner that the term "hole-blocking layer" in claim 11 has acquired a specific meaning in the art, and would be understood by one of ordinary skill in the art to be a layer having a hole-blocking function that is formed between an emitting layer and an electron transporting layer. The attorney explained to the Examiner that the applicant is not required to recite this definition in claim 11 because the term "hole-blocking layer" itself has this meaning.

The Examiner replied that she is broadly interpreting the term "hole-blocking layer" to mean "a layer having a hole-blocking function," and that since Fujita's electron transporting layer 71 has a hole-blocking function as taught in paragraph [0192] of Kobori, then Fujita's electron transporting layer 71 is a hole-blocking layer as recited in claim 11.

The attorney explained to the Examiner that she is improperly interpreting the term "hole-blocking layer" in claim 11 as being a means-plus-function element. The attorney explained that a "hole-blocking layer" as recited in claim 11 is in fact a specific structural element that a specific meaning in the art.

The Examiner was not persuaded by the attorney's arguments, and replied that she cannot change her position because under her broad interpretation of the term "hole-blocking layer," the hole-blocking layer recited in claim 11 reads on Fujita's electron transporting layer 71 having a hole-blocking function.

The Examiner also was not persuaded by the attorney's claim differentiation argument. The Examiner replied that she has indicated that claim 18 recites allowable subject matter because Fujita does not disclose two electron transporting layers comprising a donor, and that in her view, the doctrine of claim differentiation does not prevent her from interpreting Fujita's

electron transporting layer 71 as being a hole-blocking layer as recited in claim 11 because claim 11 only recites one layer besides the emitting layer.

On June 15, 2007, the attorney left a voice mail message for the Examiner proposing to amend independent claim 11 to incorporate the "electron transport layer" previously recited in claim 18 depending from claim 11, and to amend claim 18 to be consistent with the change to claim 11 so that claim 18 no longer recites the "electron transport layer," but only recites that "the electron transport layer comprises an electron donor material." The attorney explained that the proposed amendment of claim 11 would prevent the Examiner from interpreting Fujita's electron transporting layer 71 as being a hole-blocking layer as recited in claim 11.

During the telephone interview of June 19, the Examiner indicated that the proposed amendment to claim 11 would appear to overcome the rejection of claims 11-16, 19, and 20 over the prior art, but that she would not be able to make a final decision until she has reviewed the response after it has been filed.

In the interest of expediting prosecution, claims 11 and 18 have been amended in this Amendment After Final Rejection in the manner discussed during the telephone interview of June 19 in order to place the application in condition for allowance.

#### Allowable Subject Matter

Claims 1-10 and 21 have been allowed, and claim 18 has been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

#### Claim Rejections Under 35 USC 103

Claims 11-16, 19, and 20 have been rejected under 35 USC 103(a) as being unpatentable over Fujita et al. (Fujita) (EP 1017118 A2), with the Examiner relying on Kobori et al. (Kobori) (U.S. Patent Application Publication No. 2002/0038867) to show that a certain characteristic is allegedly inherent in Fujita. This rejection is respectfully traversed.

It is submitted that Fujita does not disclose or suggest "an electron injection layer" as recited in independent claim 11, or the feature of claim 11 "wherein the at least one layer

selected from the hole-blocking layer and the electron injection layer comprises an electron donor material" because it is not seen where any of FIGS. 1-14 of Fujita or any other portion of Fujita discloses "an electron injection layer" as recited in claim 11, and the only layers disclosed in Fujita as comprising "an electron donor material" as recited in claim 11 are the electron transporting layer 71 in FIGS. 5-12 and 14 of Fujita that comprises the donor 27 described in paragraph [0075] on page 8 of Fujita, and the electron transporting layer in Comparative Examples 7-8 and 10-13 and Examples 13-27 described on pages 18-30 of Fujita that comprises the donor triphenylamine (TPA), perylene, or N,N'-di-(4-methyl-phenyl)-N,N'-diphenyl-1,4-phenylenediamine (MPPD).

The above arguments were also presented on page 11 of the Amendment of July 20, 2006. In response to these arguments the Examiner states as follows on page 5 of the Office Action of September 25, 2006:

Fujita et al. teaches . . . [b]etween the light emitting layer and the cathode is an electron transporting layer containing and electron transporting material and a donor. (See Abstract). Electron transporting material blocks holes, so this layer is deemed to read upon a "hole blocking layer" (see remarks in "Response to Arguments" section below for further clarification).

and as follows on pages 6 and 7 of the Office Action of September 25, 2006:

Fujita does not expressly use the term "hole blocking" to describe the electron transport layer; however, it is well known in the art that electron transporting materials have the inherent property of blocking holes [see Kobori (US PGPub 2002/0038867), par. 192].

Kobori is a massive reference containing 308 pages. The only portions of Kobori that appear to be relevant to the issue at hand are paragraph [0101] on pages 11-12 of Kobori, which reads as follows in pertinent part (emphasis added):

[0101] The light emitting layer has functions of injecting holes and electrons, transporting them, and recombining holes and electrons to create excitons. Those compounds which are bipolarly (to electrons and holes) stable and produce a high fluorescence intensity are preferably used in the light emitting layer. The hole injecting and transporting layer has functions of facilitating injection of holes from the anode, transporting holes in a stable manner, and obstructing electron transportation. The electron injecting and transporting layer has functions of facilitating injection of electrons from the cathode, transporting electrons in a

stable manner, and obstructing hole transportation. These layers are effective for confining holes and electrons injected into the light emitting layer to increase the density of holes and electrons therein for establishing a full chance of recombination, thereby optimizing the recombination region to improve light emission efficiency.

and paragraph [0192] of Kobori relied on by the Examiner, which reads as follows (emphasis added):

[0192] To prevent the punch-through of the respective carriers from the light emitting layer, the electron blocking function of the hole transporting layer and the hole blocking function of the electron transporting layer are also effective for efficiency improvement. Furthermore, since the respective blocking layers become recombination and luminescent points in a construction having a plurality of light emitting layers, these functions are important in designing bipolar light emitting layers so that a plurality of light emitting layers may emit light.

As the applicant understands the rejection, the Examiner is of the opinion that the electron transporting layer 71 comprising the donor 27 in FIGS. 5-12 and 14 of Fujita inherently blocks holes based on the reference to "the hole blocking function of the electron transporting layer" in paragraph [0192] of Kobori, and therefore Fujita's electron transporting layer 71 comprising the donor 27 is "a hole blocking layer [that] comprises an electron donor material" as recited in claim 11. Thus, the Examiner has interpreted the term "hole blocking layer" recited in claim 11 to mean "electron transporting layer."

However, it is submitted that the Examiner's interpretation is prohibited by MPEP 2111 which provides that "[d]uring patent examination, the pending claims must be 'given their broadest reasonable interpretation consistent with the specification.' " See MPEP page 2100-37. MPEP 2111.01(I) states that "[t]his means that the words of the claim must be given their plain meaning unless the plain meaning is inconsistent with the specification. See MPEP page 2100-38. MPEP 2111.01(III) states that " 'PLAIN MEANING' REFERS TO THE ORDINARY AND CUSTOMARY MEANING GIVEN TO THE TERM BY THOSE OF ORDINARY SKILL IN THE ART," and "[t]he ordinary and customary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." See MPEP page 2100-39.

Here, it is submitted that the meaning "electron transporting layer" attributed by the Examiner to the term "hole blocking layer" recited in claim 11 is inconsistent with the specification of the present application in which these terms describe two different layers. See, for example, amended FIG. 3 submitted with the Amendment of July 20, 2006, which shows an electron injection layer and/or electron transport layer 304, and a hole blocking layer 306, and paragraph [0029] of the specification which refers to "forming one or more layers of HBL 306, ETL 304 and HBL 306 +ETL 304," wherein "HBL 306" refers to the hole blocking layer 306 in FIG. 3 and "ETL 304" refers to the electron transport layer 304 in FIG. 3.

Also, it is submitted that one of ordinary skill in the art would have understood the terms "electron transporting layer" and "hole blocking layer" to mean two different layers. This is readily apparent from Fujita which uses the term "hole injection restraining layer" to mean "hole blocking layer." According to paragraph [0032] on page 5 of Fujita, "the hole injection restraining [i.e., hole blocking] layer is formed between the light emitting layer and the electron transporting layer." FIGS. 5-12 of Fujita show the hole injection restraining [i.e., hole blocking] layer 6 formed between the light emitting layer 51 or 52 and the electron transporting layer 71. This is similar to the arrangement shown in amended FIG. 3 of the present application which shows the hole blocking layer 306 formed between the emitting layer 308 and the electron injection layer and/or electron transport layer 304.

Furthermore, in light of the fact that dependent claim 18 depending from claim 11 recites that "the multiple organic film layers further comprise an electron transport layer" and that "the electron transport layer comprises an electron donor material" it is submitted that the Examiner is precluded by the doctrine of claim differentiation from interpreting the term "hole blocking layer" recited in claim 11 to mean "electron transporting layer." The doctrine of claim differentiation "normally means that limitations stated in dependent claims are not to be read into the independent claim from which they depend." See *Nazomi v. ARM*, 403 F.3d 1364, 1370 (Fed. Cir 2005). Here, since dependent claim 18 recites the limitation of "an electron transport layer," under the doctrine of claim differentiation, it is submitted that the Examiner cannot interpret independent claim 11 from which dependent claim 18 depends as also reciting this limitation.

For at least the foregoing reasons, it is submitted that the Examiner's interpretation of the term "hole blocking layer" recited in claim 11 to mean "electron transporting layer" is improper,

such that Fujita's electron transporting layer 71 comprising the donor 27 is not "a hole blocking layer [that] comprises an electron donor material" as recited in claim 11 as alleged by the Examiner.

Accordingly, it is submitted that It is submitted that Fujita does not disclose or suggest "an electron injection layer" as recited in claim 11 or the feature of claim 11 "wherein the at least one layer selected from the hole-blocking layer and the electron injection layer comprises an electron donor material" for the reasons discussed above at the beginning of this discussion.

The above arguments were also presented on pages 10-13 of the Amendment of December 22, 2006. In response to these arguments, the Examiner states as follows on page 4 of the Final Office Action of March 23, 2007:

Applicant argues "Fujita does not disclose or suggest 'an electron injecting layer' as recited in independent claim 11' ". The examiner submits that claim 11 does not require an electron injecting layer. Claim 11 sets forth "at least one layer selected from a hole blocking layer and an electron injection layer".

However, the Examiner has apparently misunderstood the applicant's arguments with respect to this point. Claim 11 recites "at least one layer selected from a hole-blocking layer and an electron injection layer," and "wherein the at least one layer selected from the hole-blocking layer and the electron injection layer comprises an electron donor material." In order to meet these limitations of claim 11, Fujita must disclose or suggest a hole blocking layer that comprises an electron donor material, and/or an electron injection layer that comprises an electron donor material. However, Fujita does not disclose or suggest an electron injection layer, and thus necessarily does not disclose an electron injection layer that comprises an electron donor layer. Nor does Fujita disclose or suggest a hole blocking layer that comprises an electron donor material because the only layers disclosed in Fujita that comprise "an electron donor material" are the electron transporting layer 71 in FIGS. 5-12 and 14 of Fujita that comprises the donor 27 described in paragraph [0075] on page 8 of Fujita, and the electron transporting layer in Comparative Examples 7-8 and 10-13 and Examples 13-27 described on pages 18-30 of Fujita that comprises the donor triphenylamine (TPA), perylene, or N,N'-di-(4-methyl-phenyl)-N,N'-diphenyl-1,4-phenylenediamine (MPPD).

The Examiner continues as follows on page 4 of the Final Office Action of March 23, 2007:

Fujita does teach an electron transporting layer comprising an electron donor material and one of ordinary skill in the art recognizes that an electron transporting layer has hole blocking properties as evidenced by Kobori (US 2002/0038867) and accordingly, the electron transporting layer of Fujita is considered to read upon the "hole blocking layer" of the claims. Since claim 11 does not require a separate and distinct electron transporting layer in addition to a hole blocking layer, the electron transporting layer of Fujita is deemed to satisfy all of the requirements of a layer having a hole blocking function as required by claim 11.

However, claim 11 does not recite an electron transporting layer having hole blocking properties, or a layer having a hole blocking function, but recites "a hole blocking layer," and accordingly it is submitted that the Examiner is required to show that Fujita discloses or suggests "a hole blocking layer" as recited in claim 11.

Pursuant to MPEP 2111 referred to above, which the Examiner is required to follow, during patent examination, the pending claims must be "given their broadest reasonable interpretation consistent with the specification." *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1667 (Fed. Cir. 2000). However, MPEP 2111 further provides that the broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach. *In re Cortright*, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999).

Here, it is submitted that the Examiner's interpretation of Fujita's electron transporting layer having hole blocking properties as being a hole blocking layer as recited in claim 11 is inconsistent with the interpretation that those skilled in the art would reach. Rather, it is submitted that one of ordinary skill in the art would understand that a hole blocking layer (which Fujita calls a hole injection restraining layer) is a layer that is formed between a light emitting layer and an electron transporting layer to increase the height of an energy barrier between the light emitting layer and the electron transporting layer. See, for example, paragraphs [0031] and [0032] of Fujita, which read as follows (emphasis added):

**[0031]** However, at applying a regular bias, because the ionization potential of the donor is smaller than that of the electron transporting material contained in the electron transporting layer, the height of the energy barrier between the light emitting layer and the electron transporting layer making a role of confining holes in the light emitting layer becomes small. Thus, holes cannot be effectively confined in the light emitting layer and the

recombination possibility of electrons and holes is lowered, and as the result thereof, the light emitting efficiency is lowered.

**[0032]** For solving the problem, in the invention, the hole injection restraining layer is formed between the light emitting layer and the electron transporting layer. By the existence of the hole injection restraining layer, the height of the energy barrier making the role of confining the holes in the light emitting layer can be more increased than the case of directly contacting the electron transporting layer and the light emitting layer. Thus, the holes can be effectively confined in the light emitting layer and in spite of that a donor is doped in the electron transporting layer, a high light emitting efficiency can be obtained.

In light of this specific disclosure in Fujita, it is submitted that the Examiner's interpretation of the electron transporting layer 71 comprising the donor 27 in FIGS. 5-12 and 14 of Fujita as being a "hole blocking layer" as recited in claim 11 is unreasonable pursuant to MPEP 2111 referred to above.

The Examiner continues as follows on page 4 of the Final Office Action of March 23, 2007:

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a hole blocking layer and a electron transport layer as two distinct and separate layers) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The Examiner has apparently misunderstood the applicant's arguments with respect to this point. The applicant is not arguing that the Examiner should read limitations from the specification into claim 11. Rather, the applicant is arguing that the Examiner must interpret the term "hole blocking layer" in claim 11 in a manner that is both consistent with the specification and with the meaning that this term would have to one of ordinary skill in the art at the time of the invention as the Examiner is required to do. The point of the applicant's arguments is that since both the present application and Fujita define a hole blocking layer and an electron transport layer (called a hole injection restraining layer and an electron transport layer in Fujita) as two different elements, it is unreasonable for the Examiner to interpret Fujita's electron transporting layer 71 in FIGS. 5-12 and 14 of Fujita as being "a hole blocking layer" as recited in claim 11.

The Examiner concludes as follows on pages 4 and 5 of the Final Office Action of March 23, 2007:

The rejected claims only require one layer in the organic film layer other than an emitting layer and the "electron transporting layer" taught by Fujita et al. is deemed to teach all of the material requirements of the required layer adjacent the emitting layer.

It is noted that claim 18 does require a separate and distinct electron transport layer in addition to either the hole blocking layer or the electron injecting layer as required by claim 11. Claim 18 has been indicated as comprising allowable subject matter.

These comments by the Examiner appear to be in response to the applicant's arguments relating to the doctrine of claim differentiation which were repeated above, but do not directly address the applicant's arguments. The Examiner has not provided any arguments as to why the doctrine of claim differentiation as set forth in *Nazomi v. ARM* referred to above should not apply to the Examiner's interpretation of claim 11 and claim 18 depending therefrom. As discussed above, since dependent claim 18 recites the limitation of "an electron transport layer," under the doctrine of claim differentiation, it is submitted that the Examiner cannot interpret independent claim 11 from which dependent claim 18 depends as also reciting this limitation.

For at least the foregoing reasons, it is submitted that Fujita's electron transporting layer 71 comprising the donor 27 in FIGS. 5-12 and 14 of Fujita is not "a hole blocking layer" as recited in claim 11 as alleged by the Examiner.

However, in an effort to eliminate this issue, as discussed during the telephone interview of June 19, 2007, discussed above, independent claim 11 has been amended to incorporate the "electron transport layer" previously recited in claim 18 depending from claim 11, and claim 18 has been amended to be consistent with the change to claim 11 so that claim 18 no longer recites the "electron transport layer," but only recites that "the electron transport layer comprises an electron donor material." It is submitted that the amendment of claim 11 requires the Examiner to interpret Fujita's electron transporting layer 71 as being an electron transport layer as now recited in claim 11, thereby preventing the Examiner from interpreting Fujita's electron transporting layer 71 as being a hole-blocking layer as recited in claim 11.

For at least the foregoing reasons, it is submitted that Fujita does not disclose or suggest the combination of "an electron transport layer" and the feature "wherein the at least one layer

selected from the hole-blocking layer and the electron injection layer comprises an electron donor material" recited in claim 11.

For at least the foregoing reasons, it is respectfully requested that the rejection of claims 11-16, 19, and 20 (i.e., claim 11 discussed above and claims 12-16, 19, and 20 depending therefrom) under 35 USC 103(a) as being unpatentable over Fujita be withdrawn.

Conclusion

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

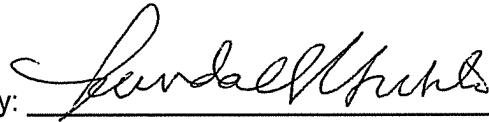
Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with the filing of this paper, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

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